SCIENCE.

North Polar Exploration.

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(Concluded.)

The vital question now arises—what is the width and condition of this pack? Parry, in 1827, ascertained that it was at least 192 miles broad, by walking over it, and at his extreme northern point in 82° 45', a strong ice blink was seen on the northern horizon. This was in the end of July. We may, therefore, take its average width at that time of the year to be about 250 miles. It is hoped that an expedition may enter the pack between Spitzbergen and Nova Zembla towards the end of July, under favourable circumstances, notwithstanding the failure of all former attempts. This hope is based on the great advantage that steamers have over sailing vessels, and on the presumed action of the Gulf-stream in melting and loosening the pack. All then depends on the time that it will take for vessels to force their way through it. (1) Let us see upon what grounds we may calculate the probable length of this detention. The width of the Polar pack in the end of July is not less than 250 miles; that of the middle pack in Baffin's Bay is generally about 172. Now the average detention in Baffin's Bay, calculating from the time taken by the six expeditions, assisted by steam power (for we may now leave sailing vessels out of the question), has been twenty-two days. But by holding on to the land ice very little ground is ever lost in Baffin's Bay, and the existence of the land floe makes eventual success almost a certainty; while between Spitzbergen and Nova Zembla there is a drifting pack with no land ice to assist navigation, and progress is dependent on the chance of lanes opening in the right direction. With extraordinary luck, however, steamers might bore their way through this 250 miles of pack in forty days, and reach open water beyond, towards the end of August. If an attempt is made to take the pack earlier in the year, it will of course be found to be much wider and closer, and the detention will be proportionably longer. Under fortunate circumstances, steamers may, perhaps, get through the pack in August, so as to have about a fortnight left for North Polar exploration in the supposed open water to the northward, before the young ice begins to form. It must be remembered that dense fogs prevail in summer wherever there is a large surface of open water, in the Arctic regions. If a navigable sea exists, however, some interesting discoveries may be made in its hydrography and fauna, and a series of useful magnetic observations may be taken. But the generally admitted absence of land (2) on that meridian precludes the idea of wintering in safety, and destroys all chance of obtaining many of the important scientific results which have been enumerated as attainable from North Polar exploration, when undertaken in the right direction. The objections to the Spitzbergen route are that the chances are against a successful passage through the Polar pack; that, even should this obstacle be overcome, there would be so little of the navigable season left that scarcely anything would be done; and that none of the objects of North Polar exploration would be attained in the event of failure, very few in the less probable event of success; while if the vessels are prevented from returning before the winter sets in, they will be in extreme peril. (1)

We now come to the consideration of the Smith Sound route. This route is recommended by a great weight of authority—by Sir George Back, the Nestor of Arctic exploration; by Admiral Wrangell, (2) the discoverer of the northern shores of Siberia; by Admiral Collinson; by Sir Leopold M'Clintock, the highest living Arctic authority; by Sherard Osborn, whose admirable paper first brought North Polar exploration into notice; by Vesey Hamilton, whose Arctic experience is only second to that of M'Clintock; and by Captain Maury, the great American hydrographer.

Smith Sound is ascertained to be a broad strait leading into the unknown Polar region, and its shores are the most northern known land in the world. They are, therefore, the best point of departure whence sledge parties may push onwards over the Polar region, and the best wintering station for vessels forming a scientific expedition. It is proposed that two well-fortified gunboats, of 60-horse power, should proceed up Baffin's Bay to Smith Sound; that one should winter near Cape Isabella, at its entrance, and that the other should go further north, so as to winter at a distance of about 300 miles from her consort. There is no doubt about vessels being able to reach the entrance of Smith Sound, at the head of Baffin's Bay, every summer. The ice drifting from the seas, whose portals are Smith, Jones, and Lancaster Sounds, forms what is called the *middle pack* during the summer, stretching across the centre of Baffin's Bay; while the head of the bay, upon which the above sounds open, is always free of ice in the summer, and is called the "*North Water.*" The *middle pack* is about 170 miles wide, and the reason why it may always be passed, while the Polar pack cannot, is that on the eastern side of Baffin's Bay there is an identation called Melville Bay, filled with ice firmly attached to the land, and known as the *land floe*. Vessels make fast to this *land floe*, while the middle pack drifts past, and thus creep up through a lane of water which is occasionally left between the fixed and drifting ice, sooner or later reaching the "*North Water.*" Out of thirty-eight exploring vessels that have gone up Baffin's Bay since its discovery in 1616, not one has been lost, and not one has failed to reach the "*North Water,*" when the necessary conditions of success have been observed—namely, arrival at the edge of the ice early in the season, and sticking to the land floe. Two only (3) out of thirty-eight have failed, and neither adhered to these conditions. The whalers do not persevere in the attempt, unless they can pass through early in the season; yet, in twenty-seven out of thirty-two years, from 1817 to 1849, they succeeded in reaching the "*North Water.*" In 1849 a whaler reached the

(1) The analogy which has been attempted to be drawn between the pack in the Southern hemisphere, through which Sir James Ross forced his way (*Southern Seas*, ii. p. 183), and the Polar pack, between Spitzbergen and Nova Zembla, is entirely delusive. On December 18th, 1841, Sir James entered the pack, in latitude 60° 50' S., and, after being beset in it for fifty-six days, at last emerged into open water on February 2nd. This pack was 800 miles wide. On the 24th he was obliged to relinquish all further exploration, on account of the formation of young ice, which threatened to freeze the ships up for the winter in a most dangerous position, but fortunately they were saved by a strong breeze (ii. p. 203). Thus he only had three weeks of navigable season left, after getting through the pack. This pack in the Southern hemisphere was met with in the temperate zone, after having drifted through hundreds of miles in a boundless ocean, and become loose and broken. The North Polar pack, on the contrary, is but a short distance from the place of its formation, and is in a confined sea surrounded on all sides by continents.

(2) Some of the advocates of the Spitzbergen route speculate on the existence of land; but the whole argument in favour of that route is based on its supposed absence. This supposition is founded on the absence of icebergs and of any mud or debris on the ice, of which the Polar pack is composed. The argument is perfectly sound so far as it goes.

(1) Open lanes and water-holes, no doubt, exist throughout the winter in the Polar region, caused by currents, and the ice is thus kept in occasional motion by gales of wind. It is this condition of the ice which would cause the extreme danger of wintering in the Polar pack north of 80°, at a distance from any land. The ships would be kept in motion, and perhaps dashed about amongst heaving blocks of ice in a gale of wind, at a time of year when the incessant night and the intense cold render navigation out of the question. The men would find it impossible to work aloft, and the running rigging would be frozen too hard to reeve through the blocks.

(2) See *Royal Geographical Society's Journal*, vol. xviii, p. 19 (1848).

(3) One of these was the "North Star," in 1849. She took the pack and was drifted across the Melville Bay, not getting clear of the ice until the navigable season was over. She started very late in the summer. In the very same year a whaler (the "St. Andrew") reached the "*North Water*" on June 12th, a clear proof that if the "North Star" had started early, she would have got through successfully.